



Introduction to ArcView

**OC 3030:
Lecture 2**



Learning Objective



- To provide an introduction to the ArcView desktop GIS software package
- To help the user understand the terminology used.



What is ArcView GIS?



- It is a desktop Geographic Information System – a data base that links information to location (i.e., the what to where).
- The Arcview user interface consists of windows that present information in different ways. Rows of menus, buttons, and tools at the top of the main application window allow the user to view and perform analytical operations on the data in the database.



Vector GIS Software



ArcView

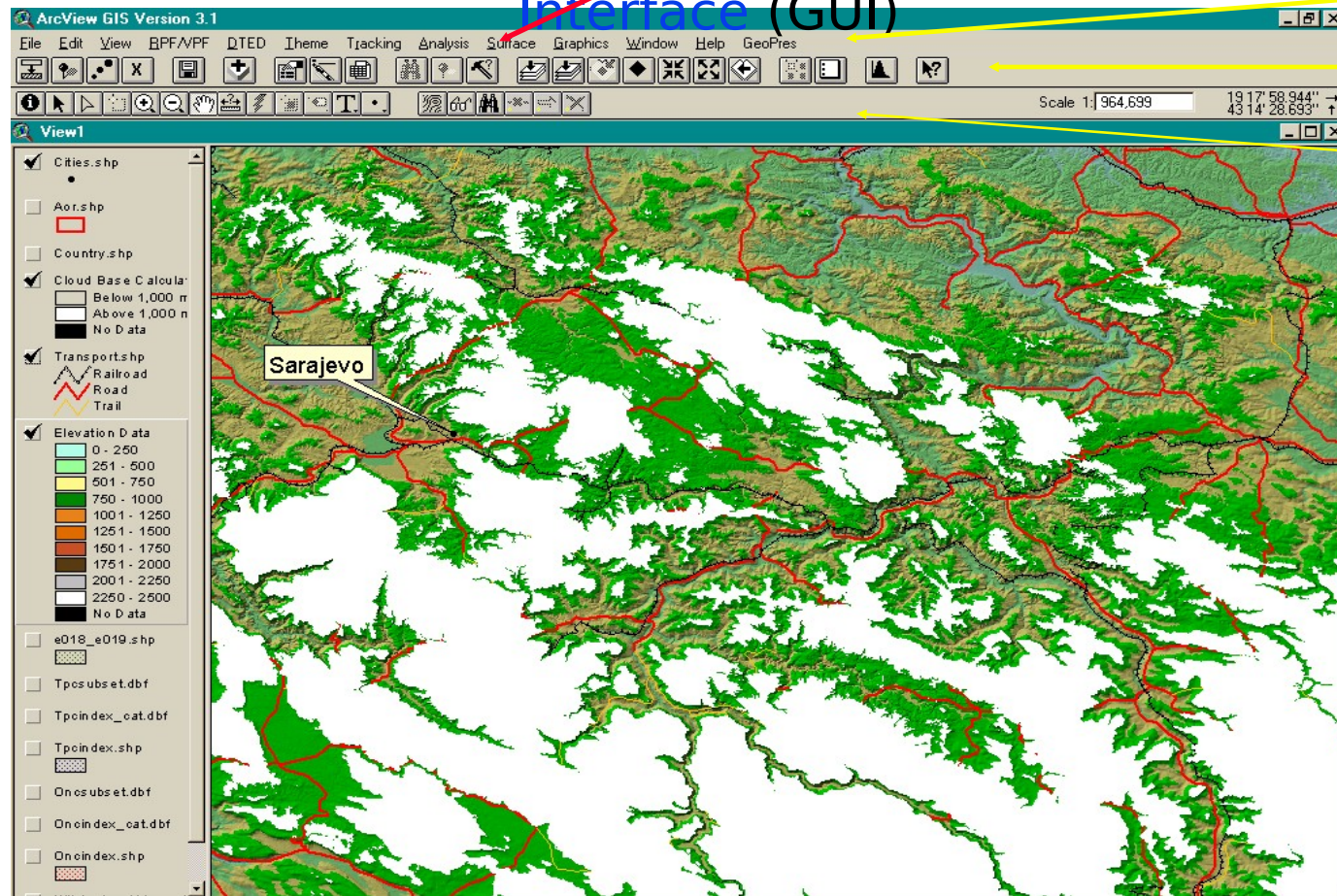
- **ArcView** was initially developed as a **data viewer**.
- Graphical User Interface & Open Source accessibility quickly won popularity
- Current version is **very robust**; however, it still **does not** rival Arc/Info's capabilities
- Entirely window driven (no command line)



Menus, Buttons & Tools



Located at the top of the main application window. Also known as the **Graphical User Interface (GUI)**



Menu
Bar

Button
Bar

Tool Bar

Status Bar



Detailed Overview



- Documents / Projects
 - Views
 - Tables
 - Charts
 - Layouts
 - Scripts
- Map Projections
- ArcView Extensions



ArcView Projects



ArcView **projects** are used to organize and store a collection of associated documents that work together during an ArcView session.

Project information is stored in a **project file**. (.apr)

The **project window** displays the names of all project documents.



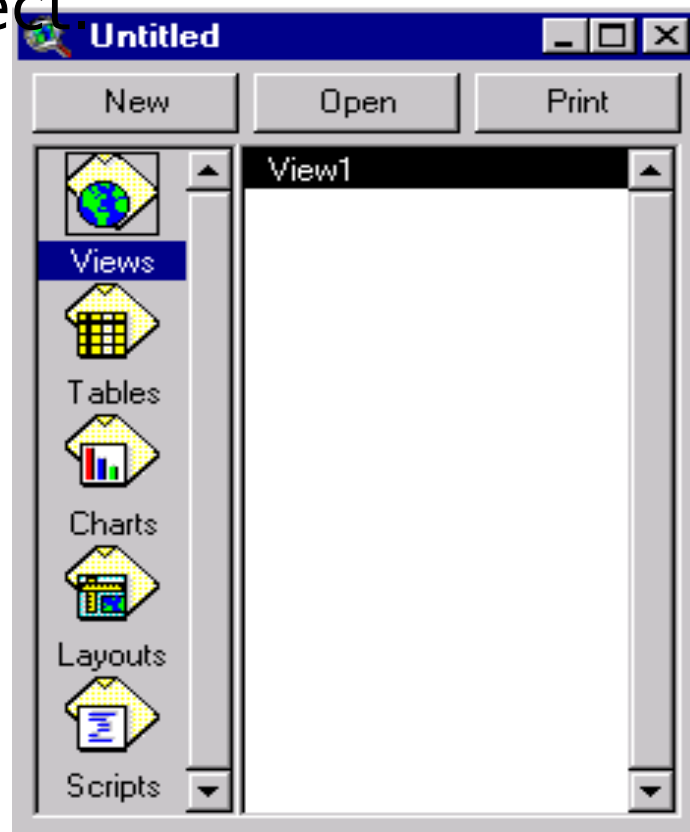
ArcView Documents



At the start of an ArcView session, the main GIS window contains an untitled Project window. Used to **add/manage** documents in a project.

Document

- ~~Views~~ **Type**
- Tables
- Charts
- Layouts
- Scripts



Each project can have one or more documents of each type (except Views).



Views



- Display ***collections*** of geographic data files (***themes***), that cover the same geographic area
- Provides an interactive map display
- Contains a *Table of Contents*.

Note: Each theme in the Table of Contents has a check box next to its name. If the box is checked, the theme is displayed. If it is not checked, the theme is not displayed. The user controls the theme displays – simply check or uncheck the box.



Conceptual Overview



In ArcView geographic *features* can be:

- Points
- Lines
- Polygons

These features are stored in a database along with their *feature attributes* (i.e., descriptive information). These attributes are displayed in a spreadsheet format, called a Table.

A GIS links sets of features (with their attributes), and manages them in units called *themes*. Themes are displayed as *views*.

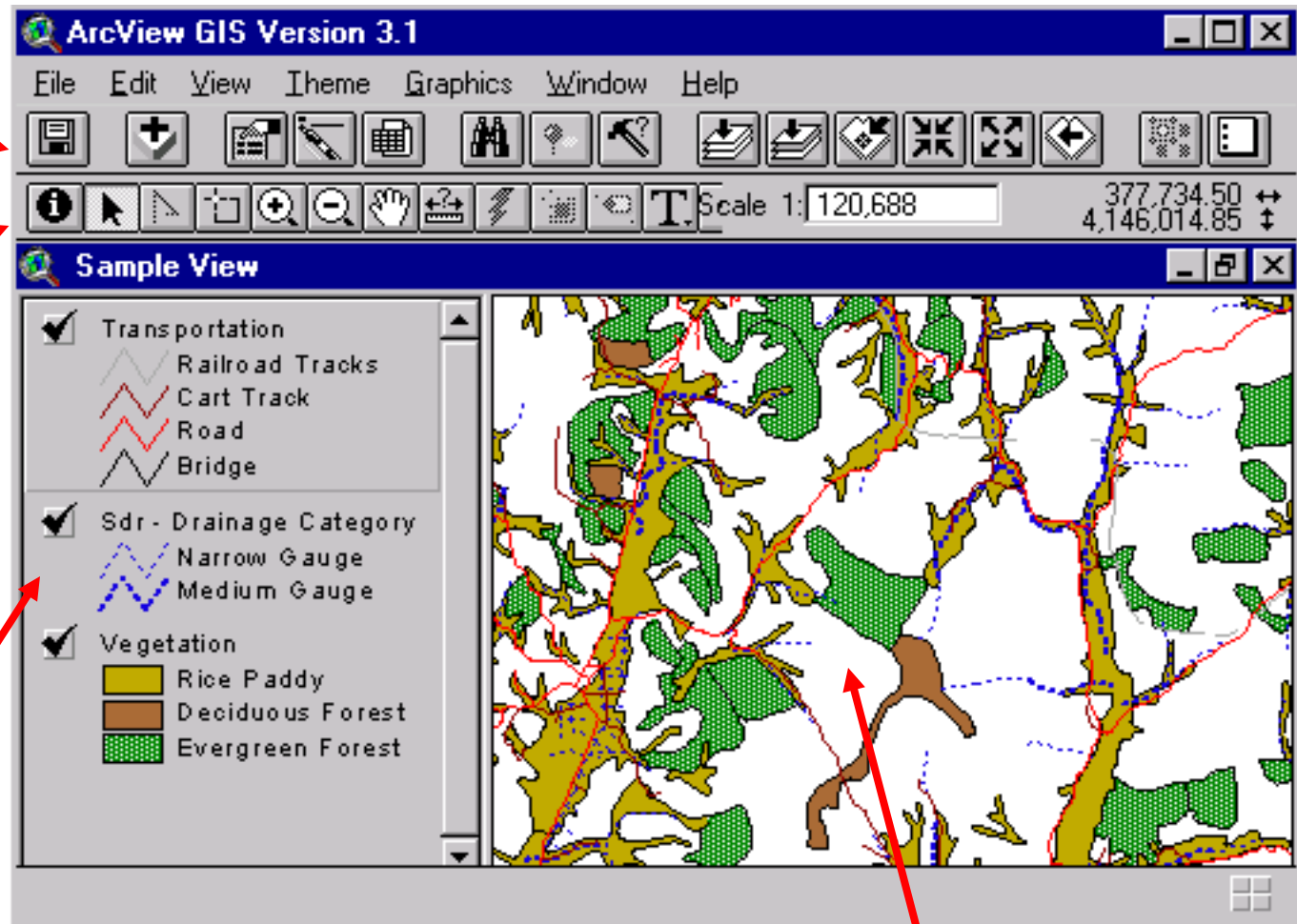
View Example

Buttons

Tools

**Legend
(Table of**

**Map
Display**





Tables



- Display tabular information in a spreadsheet type format
- Formats data into ***records*** (rows) and ***fields*** (columns).
- Each record represents a single feature and each field a single attribute for that feature.
- Tables can be edited to add, change, or delete records and fields.

Table Example

| Attributes of Veg | | | | | | | |
|-------------------|-------------|-----------|------|--------|----------|-----|-----|
| Shape | Area | Perimeter | Veg# | Veg-id | Featcode | Qnt | Veg |
| Polygon | 189468.750 | 2958.948 | 2 | 711 | 5C030 | 2 | 15 |
| Polygon | 2695990.500 | 22840.533 | 3 | 49 | 5A010 | 2 | 4 |
| Polygon | 195944.813 | 2323.856 | 4 | 693 | 5C030 | 2 | 15 |
| Polygon | 144459.281 | 3206.464 | 5 | 847 | 5B020 | 2 | -99 |
| Polygon | 5674181.000 | 19825.100 | 6 | 14 | 5C030 | 2 | 15 |
| Polygon | 225079.781 | 2763.482 | 7 | 622 | 5A010 | 2 | 3 |
| Polygon | 61702.203 | 1034.310 | 8 | 1282 | 5A010 | 2 | 1 |
| Polygon | 290173.781 | 3561.013 | 9 | 512 | 5A010 | 2 | 4 |

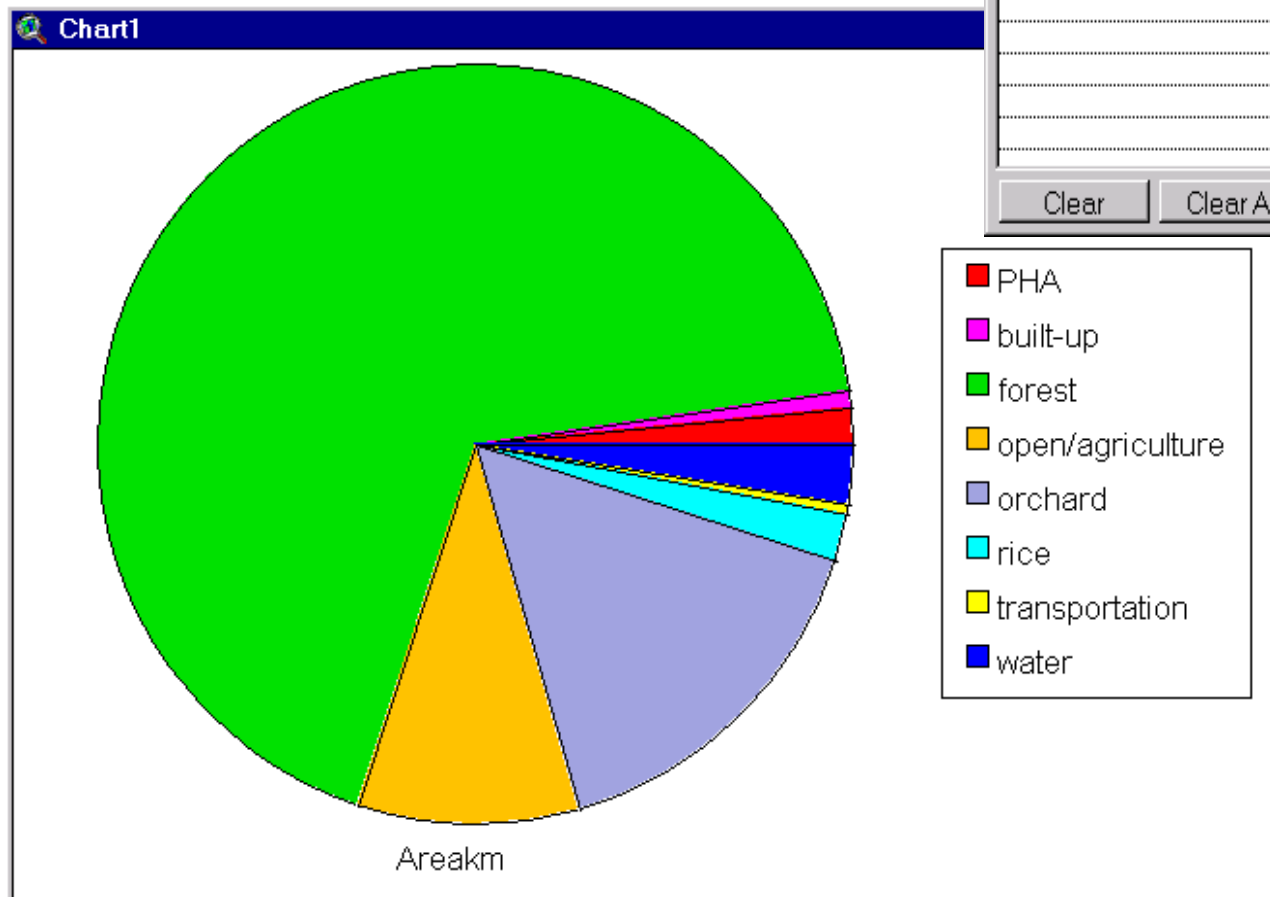


Charts



- Provide a visual representation of a table
- Graphically summarize information in tables
- Allow you to interactively query tables
- ArcView supports area, bar, column, line, pie and x,y scatter charts.

Chart Example



| Identify Results | |
|---------------------------------------|--------------------------|
| 1: Chart1 - open/agricul | Shape Polygon |
| | Lctype open/agriculture |
| | Count 14 |
| | Sum_area 6155350.0000 |
| | Areakm 61554 |
| | Imagery D:\Thailand\imag |
| <div>Clear</div> <div>Clear All</div> | |



Layouts



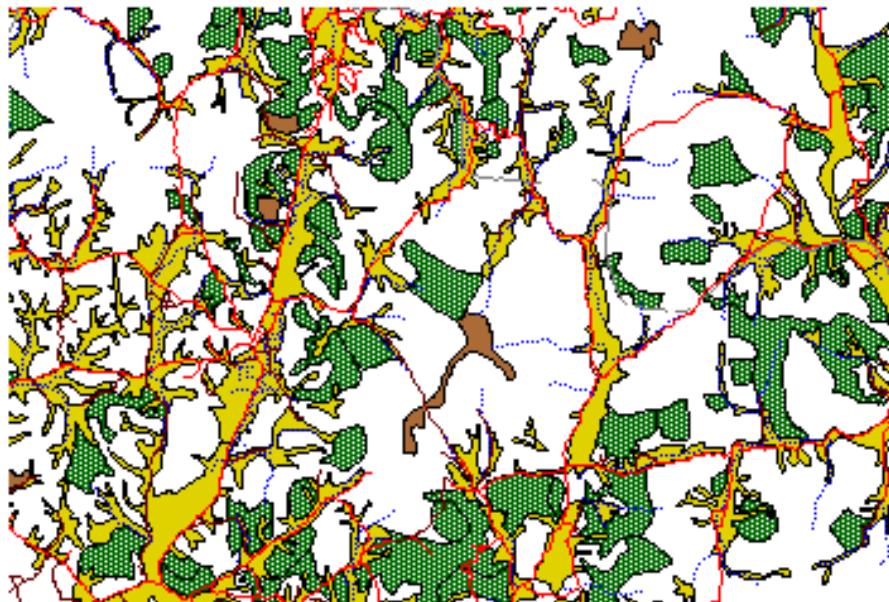
- Documents on which you can arrange views, tables, charts and images as graphic elements.
- Used to compile a product (map) for printing and exporting.

Note: Cartographic map components such as neatlines, north arrows, scale bars and legends can be placed on layouts.

Layout Example

Map Title

Korea Data Set





Legend

Transportation

-  Railroad Tracks
-  Cart Track
-  Road
-  Bridge

Sdr - Drainage Category

-  Narrow Gauge
-  Medium Gauge

Vegetation

-  Rice Paddy
-  Deciduous
-  Evergreen

North Arrow



Scale





Scripts



- Used to customize almost any aspect of the standard ArcView interface
- Written using the Avenue application development language

Note: Avenue code is written in a Script editor document. The script editor allows you to create, modify, compile, execute, and debug Avenue script.



Script Example



```
area_per
' Get the view and it's projection if any.
'
theView = av.GetActiveDoc
thePrj = theView.GetProjection
if (thePrj.IsNull) then
    hasPrj = false
else
    hasPrj = true
end

'
' Get the list of active themes. if there aren't any, let the user know
' and exit.
'
theActivethemeList = theView.GetActivethemes
if (theActivethemeList.Count = 0) then
    MsgBox.Error("No active themes.", "")
    Exit
end

'
' Loop through the list of active themes. if you can't edit the theme
' inform the user.
```



Getting Data Into ArcView



Organizational Hierarchy



Projects

(Can contain many views)



Views

(Display themes from many data sources)



Themes

(Use symbols to represent real-world features by points, lines or



ArcView Data Sources



- Vector data (data that stores the location, shape and attributes of each feature)
 - Shapefiles (the ArcView format for storing location and attribute information for each feature).
 - ARC/INFO Coverages (in “coverage” format)
 - MapInfo Files
- ARC/INFO’s raster data format (called a **Grid**)
- Image Data
- Tabular (matrix) data



Vector Data



- A **shapefile** is the native ArcView format that is used for vector data
- Each shapefile is a collection of files
 - Spatial data (shape geometry) **.shp**
 - Spatial data index **.shx**
 - Attribute data **.dbf**



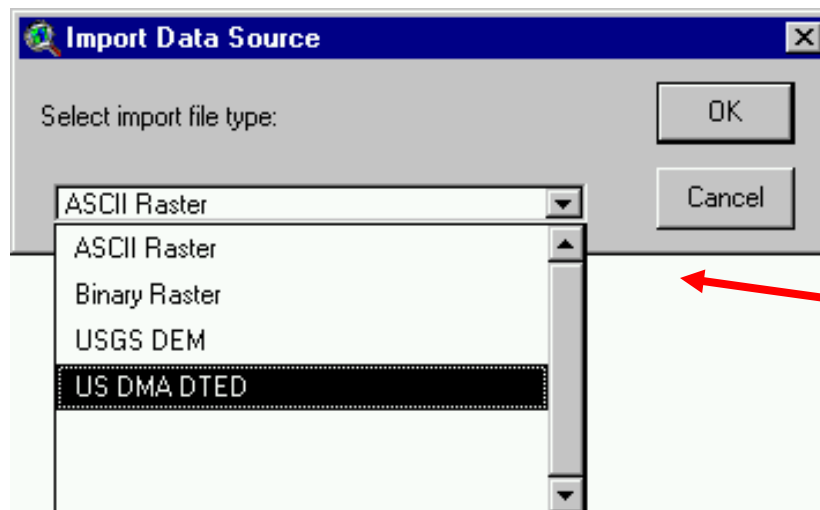
Raster Data



- ArcView themes (known as **image themes**) can be created from image data (e.g., satellite images, aerial photographs, scanned documents).
- Image Themes do not have attribute tables. Can be manipulated by using the Image Legend editor.
- ArcView supported image types:
 - Erdas IMAGINE (with IMAGINE Image extension)
 - JPEG files (with JPEG extension)
 - National Image Transfer Files (with NITF extension for military users)
 - Hot Linking to GIF & MacPaint

Matrix Data*

- USGS DEM
 - *Spatial Analyst* or *3D Analyst* Extensions
- NIMA DTED
 - *Spatial Analyst* or *3D Analyst* Extensions





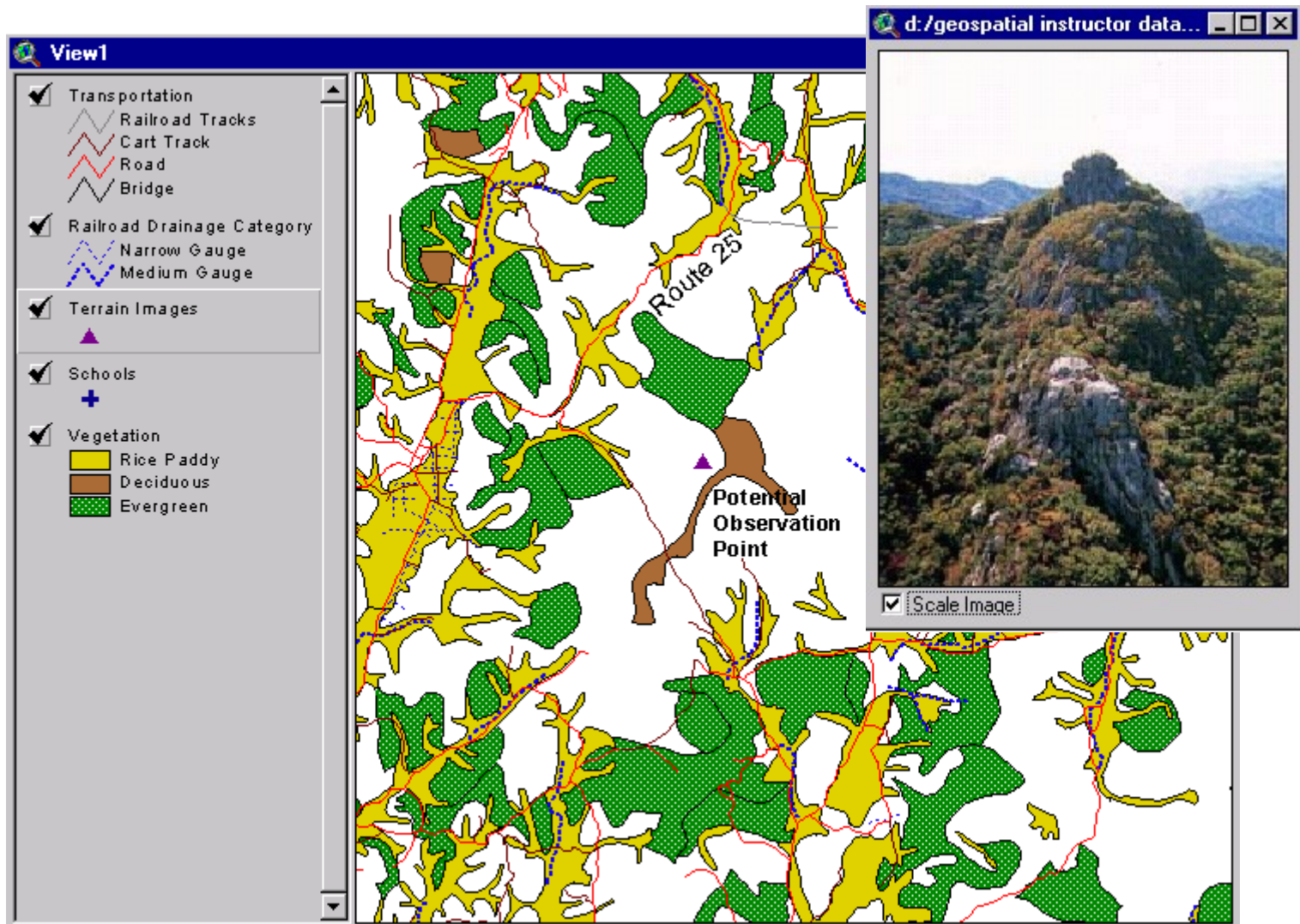
Creating Hot Links



Can be linked to:

- An image
- An Avenue script
- A Word document
- A video application
- The Web

Hot Link Example

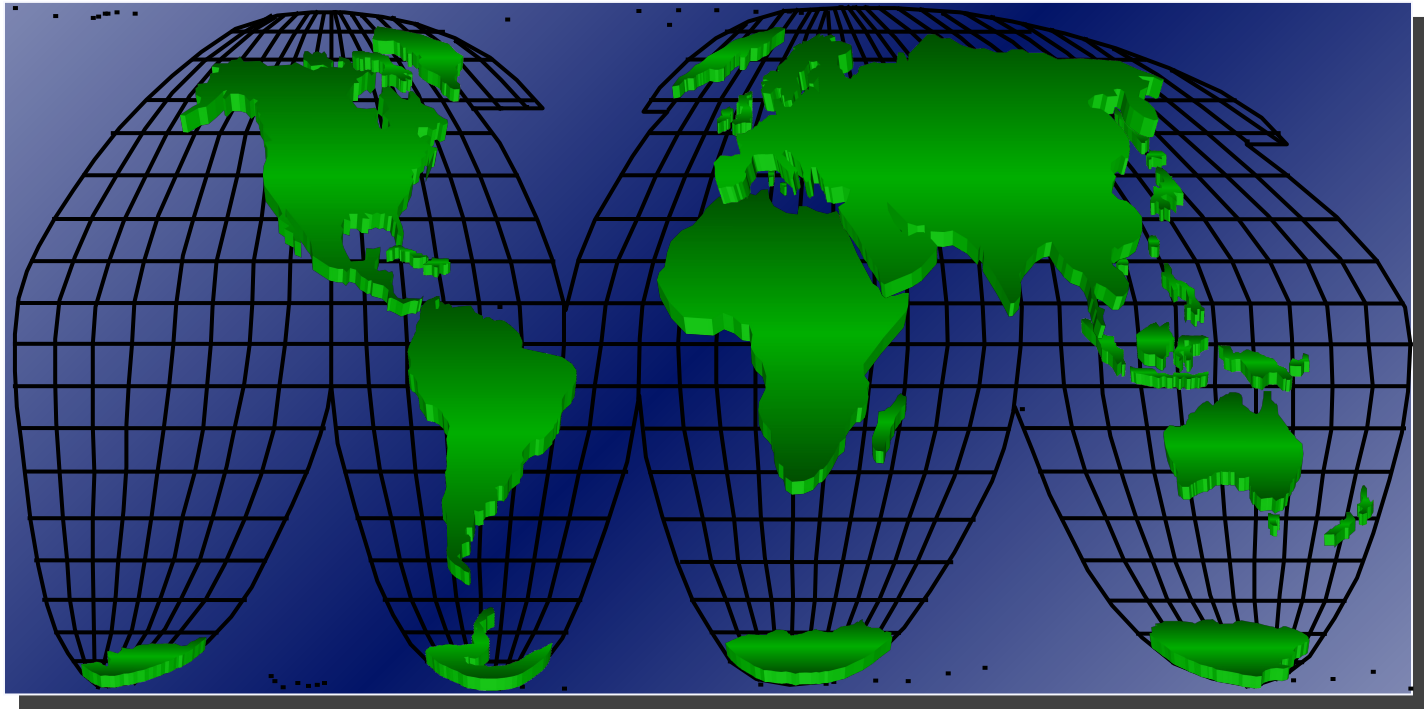




Referencing Views to the Real World



Requires a map projection – a formula that converts positional data (lat., long.) on an ellipsoidal surface to (x,y) coordinates on a planar surface.





Map Projections



When Working with a View :

- **Original data** must be in decimal degrees to be projected
- **Only the view of the data is changed**, the source coordinates are unchanged
- Projection units can be specified
- **Image and grid themes** are **unaffected** by the projection properties specified for a view – they are assumed to be in the correct projection already. **Always** use the image/grid theme projection for the view!!



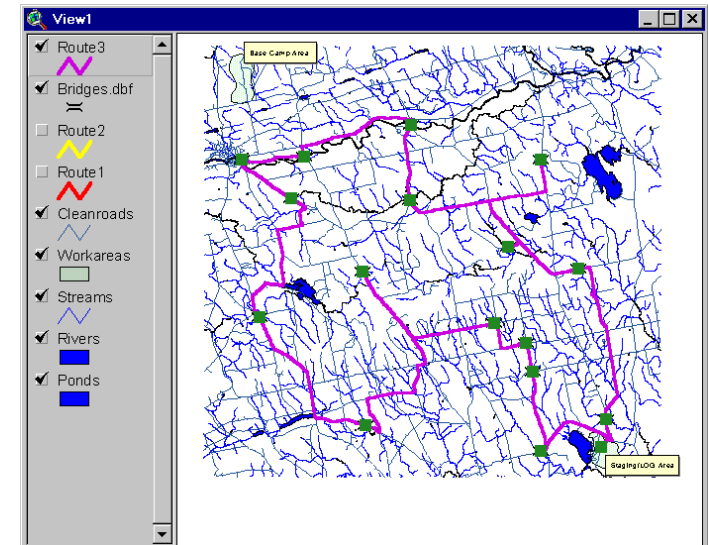
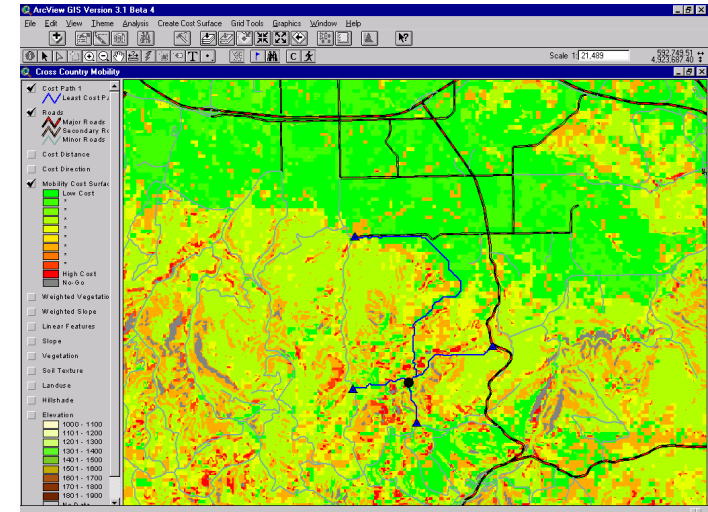
ArcView Extensions



- Provide additional capabilities
- User interface changes to reflect the additional capabilities
- May be loaded and unloaded during a session
- Will automatically load when required by an existing project

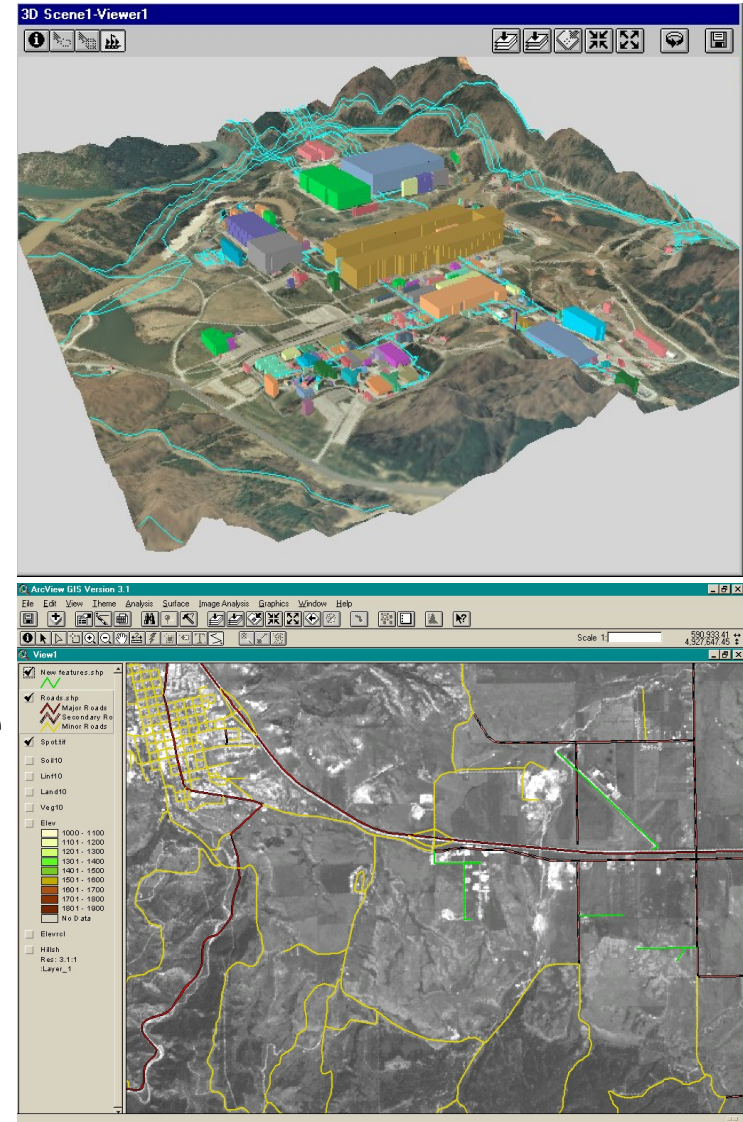
Optional Extensions

- ArcView ***Spatial Analyst***
 - Converts feature themes to grid themes
 - Contouring
 - Cell-based map analysis
- ArcView ***Network Analyst***
 - Efficient travel routing
 - Travel directions



Optional Extensions

- ArcView **3-D Analyst**
 - Analyzing & displaying surface data.
 - TIN data models, 3D shapes, and interactive perspective viewing.
- ArcView **Image Analysis**
 - Joint venture w/ERDAS
 - Basic Image Processing
 - Display, enhance, and analyze remotely sensed imagery





Summary



- Documents / Projects
 - Views
 - Tables
 - Charts
 - Layouts
 - Scripts
- Data Input
- Using Projections
- ArcView Extensions